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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/928,523	08/13/2001	Tomohiko Shibata	782_181	8032

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EXAMINER

SONG, MATTHEW J

ART UNIT	PAPER NUMBER
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1722

DATE MAILED: 06/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/928,523	Applicant(s) SHIBATA ET AL.	
	Examiner Matthew J. Song	Art Unit 1722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/8/2005 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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3. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaudo et al (US 6,533,874) in view of Yoshida et al (JP 2-34592), an English Translation has been provided, and further in view of Kim et al (US 5,728,940).

Vaudo et al discloses an apparatus for growing a (Ga,Al,In) nitride on a substrate using Hydride vapor phase epitaxy (HVPE) (Abstract). Vaudo et al discloses the HVPE reactor 52 is provided with feed ports 72, 74, 76 and 78, HCl is introduced to the reactor in feed ports 72, 76', and 78' (col 10, ln 1-67), this reads on applicant's chloride based gas, and a substrate 56. Vaudo et al also teaches feed port 74 accommodates the introduction of ammonia or other nitrogen species into the reactor in the direction and a vessel 67 of molten aluminum is provided in gas flow communication with feed port 76 (col 11, ln 1-40). Vaudo et al also teaches the growth of Al-containing nitride compounds such as AlN and AlGa_{0.5}N is complicated and to circumvent problems the entire growth reactor and or reactor liner which are employed should be constructed of alternative high temperature compatible materials, such as sapphire or graphite (col 11, ln 40-67). Vaudo et al also discloses a multi-zoned hot-wall reactor, where the temperature of the molten metals is independently controlled and temperatures of 1000-1400°C are employed (col 12, ln 1-15). Vaudo et al discloses aluminum chloride is transported to a deposition zone, this reads on applicant's downstream zone, where it reacts with ammonia to form AlN (col 11, ln 15-25). Vaudo et al discloses a vessel 67, this reads on applicant's material holder and upstream zone, and a substrate holder 60

Vaudo et al does not teach an inner reactor and outer reactor being spaced from one another.

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In an apparatus for forming single crystals, Yoshida et al teaches a quartz liner 18 spaced apart from a quartz ampoule 11, this reads on applicant's inner and outer reactor being spaced from one another (Translation pg 5 and Figs 1 and 2). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Vaudo et al with Yoshida et al's quartz liner because a liner tube between a reactor and a heater ensures uniform heating of the reactor.

The combination of Vaudo et al and Yoshida et al does not teach a gas leak detecting means and an evacuation system in communication with a space between the inner reactor and the outer reactor.

In an apparatus for detects leaks in a semiconductor device, note entire reference, Kim et al teaches a leakage gas detector 11 installed in the semiconductor manufacturing device for detecting the leakage of a reaction gas used in a semiconductor device manufacturing process (col 1, ln 1-67). Kim et al also teaches a pump 15 is connected to the detector for suctioning the leakage gas through the inflow apertures (col 2, ln 40-67), this reads on applicant's evacuation system. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Vaudo et al and Yoshida et al with Kim et al's leakage detector between the reactor and reactor liner to increase the lifespan of the apparatus and prevent explosions by detecting leaks from the ampoule (col 1, ln 15-30) and would have placed the leak detection apparatus between the reactor and the reactor liner to detect a possible leak at the earliest possible time, since the process gas are contained in the reactor.

Referring to claims 8-11, the combination of Vaudo et al, Yoshida et al and Kim et al teach all of the structural limitations of claims 8-11. Claims 8-11 also contain method limitations,

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which are considered intended use and the apparatus taught by the combination of Vaudo et al, Yoshida et al, and Kim et al would inherently be capable of performing the claimed intended use of the apparatus.

Response to Arguments

4. Applicant's arguments, see page 4 of the remarks, filed 3/8/2005, with respect to the 112 First Paragraph Rejection have been fully considered and are persuasive. The rejection of claim 8 has been withdrawn.
5. Applicant's arguments, see page 6 of the remarks, filed 3/8/2005, with respect to the 103 rejection in view of Vaudo, Yoshida and Mayeda have been fully considered and are persuasive. The rejection of claim 8-11 has been withdrawn.
6. Applicant's arguments with respect to claims 8-11 have been considered but are moot in view of the new ground(s) of rejection.
7. Applicant's arguments filed 3/8/2005 have been fully considered but they are not persuasive.

Applicant's argument that Kim does not disclose or suggest a detecting gas leaks between an inner and outer reactor is noted but is not found persuasive. The Examiner admits Kim does not teach a gas leak detection means between inner and outer reactors because Kim does not teach an inner and outer reactor. However, the Examiner maintains that based on Kim's teachings a person of ordinary skill in the art would have found it obvious to place the gas leak

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detection means between the inner and outer reactor. Kim teaches a leakage gas detector in a semiconductor device manufacturing apparatus. A person of ordinary skill in the art would have found it desirable to place the leak detection apparatus between the reactor and the reactor liner to detect a possible leak at the earliest possible time, since the process gases are contained within the reactor.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kang et al (US 6,197,683) teaches a metal source gas is mixed with a carrier gas such as Ar or N₂ to provide a smooth flow into a deposition chamber (col 6, ln 5-35).

Usui et al (JP 2000-91234) teaches HCl is supplied from an introducing pipe with a carrier gas in a HVPE process (Abstract).

Radhakrishnan (US 5,650,361) teaches an AlN chamber used for the deposition of AlN films (col 4, ln 1-15 and Abstract).

Razeghi et al (US 6,271,104) teaches all surface of a growth reaction chamber are coated with a barrier coating capable of withstanding high temperatures and not reacting with the reactants and the coating is preferably AlN (col 3, ln 15-50).

Molnar (US 6,086,673) teaches a HVPE apparatus, note Fig 1.

Ueda et al (US 6,117,213) teaches a HVPE apparatus using to form AlN (col 3).

Vaudo et al (US 6,596,079) teaches reactor liner can be used and replaced to improve reactor cleanliness and/or usable lifetime (col 11, ln 35-50).

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Kawase et al (US 4,382,776) teaches a liner tube must be provided in the gap between a processing tube and a heater, so as to ensure uniform heating of the tube (col 1, ln 5-65).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew J Song
Examiner
Art Unit 1722

MJS
June 1, 2005



ROBERT KUNEMUND
PRIMARY EXAMINER